

## REMARKS

Applicants appreciate the thorough examination of the present application that is reflected in the Official Action of February 2, 2007. In response, all of the pending claims have been amended extensively to further clarify the patentable distinctions over U.S. Patent 6,503,384 to Teshima et al. The claim amendments are fully supported by, for example, Figures 4A-4C of the specification and the accompanying description at Page 7, line 29-Page 10, line 18. Accordingly, Applicants respectfully request reconsideration and allowance of all the pending claims for the reasons that will now be described.

### **Independent Claim 1 Is Patentable Over Teshima et al.**

Independent Claim 1 stands rejected as being anticipated by Teshima et al. Independent Claim 1 has been amended to recite:

1. A method of forming localized positive optical power units, comprising:  
forming a first substrate that comprises photo-polymer or plastic material and includes a complement to a desired arrangement of localized positive optical power units; and  
molding a plurality of localized positive optical power units onto a second substrate using the first substrate that comprises photo-polymer or plastic material as a mold for the second substrate. (Emphasis added.)

Claim 1 stands rejected under 35 USC §102(b)<sup>1</sup> as being anticipated by Teshima et al. The Official Action specifically refers to Figures 5 and 7, and Column 10, lines 24-27 of Teshima et al. The rejection correctly identifies Figures 5A-5E of Teshima et al. as illustrating fabrication steps for fabricating a first substrate that includes a complement to a desired arrangement of localized positive optical power units. However, as clearly shown by Figures 5A-5E, this substrate **13** is a metal substrate that is formed by successive chemical vapor deposition and metal plating processes, to form a nickel mold. The Examiner is specifically referred to Column 9, lines 40-66 of Teshima et al.:

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<sup>1</sup> Applicants note that the rejection was made under 35 USC §102(b). However, the effective filing date of the present divisional application goes back to at least the filing date of the parent Application Serial No. 10/120,785, filed April 12, 2002. As such, the rejection should have been made under 35 USC §102(e), and is being treated as such.

A process for fabricating a mold for forming a microlens array will be described by reference to FIGS. 5A to 5E. The above structure is used as a master. PSG (phospho-silicate glass) of 1  $\mu\text{m}$  in thickness [sic] is deposited at 350° C. by an atmospheric-pressure chemical vapor deposition (CVD) method to form a sacrificial layer 7 as illustrated in FIG. 5A. Ti and Au are continuously layered with thicknesses of 10 nm and 200 nm on the above wafer, respectively, using the electron-beam evaporation method. An electrode layer 8 for electroplating the mold is thus formed as illustrated in FIG. 5B.

Ni electroplating is then performed at a bath temperature of 50° C. and a cathodic current density of 5 A/dm<sup>2</sup> as illustrated in FIG. 5C. The above master is used as a base, and the above electrode layer 8 is used as the cathode. Ni electroplating bath containing nickel (II) sulfate, nickel (II) chloride, boric acid and brightener is used. Thus, a concave mold 13 is formed as illustrated in FIG. 5C.

The wafer of FIG. 5C is then immersed in a mixture solution of hydrofluoric acid and ammonium fluoride to etch and remove the sacrificial layer 7 of PSG. The substrate 1 and the mold 13 can be separated from each other as illustrated in FIG. 5D. The Ti of the electrode layer 8 for electroplating the mold can be removed simultaneously. After that, the Au of the electrode layer 8 is etched by a mixture solution of iodine and potassium iodide. The mold 13 for a convex microlens array can be thus produced as illustrated in FIG. 5E.

In sharp contrast, Claim 1 has been amended to specifically recite forming a first substrate that comprises photo-polymer or plastic material and includes a complement to a desired arrangement of localized positive optical power units. Claim 1 also has been amended to recite that the first substrate is used as a mold for the second substrate. The use of a photo-polymer or plastic material for a complement mold may provide many potential advantages in terms of reduced cost, ease of manufacturing and/or manufacturing process simplification, and is not described or suggested in Teshima et al. For at least these reasons, Claim 1 is neither anticipated by nor obvious in view of Teshima et al.

#### **Many of the Dependent Claims Are Separately Patentable**

Dependent Claims 2-8, 10-11 and 13-18 have been amended for consistency with independent Claim 1 and are patentable at least per the patentability of Claim 1

from which they depend. Moreover, many of these claims are independently patentable.

For example, Claim 4 recites that the plastic material comprises a thermal plastic material which is hardened to retain its shape. Applicants respectfully submit that Teshima et al. is replete with a detailed description of metal electroplating processes to form a complement mold, but does not describe or suggest the use of a thermal plastic material that is hardened to retain its shape. Accordingly, Claim 4 is independently patentable.

Claim 5 recites the use of a photo-polymer material that is polymerized with ultraviolet light. Claim 5 is independently patentable because Teshima et al. is replete with a detailed description of metal electroplating processes to form a complement mold, but does not describe or suggest the use of a thermal plastic material that is hardened to retain its shape. Accordingly, Claim 5 is independently patentable.

Finally, Claims 13-18 recite that the second substrate comprises photo-polymer that may be hardened by photo-polymerization, for example, photo-polymerization with ultraviolet light. These types of second substrates may be particularly useful when the first substrate also comprises photo-polymer or plastic material, which can be transparent to ultraviolet light, so as to allow the photo-polymerization of the second substrate to take place through the first substrate. The use of a photo-polymer or plastic material for both the first and second substrates is certainly not described or suggested by Teshima et al.

Applicants also wish to address the Examiner's analysis relative to Claims 4-7 and 9-12 under 35 USC §103(a) at Paragraph 3 of the Detailed Action. In this section, the Examiner states:

While Teshima et al employs electroplating methods to make the mold, it is respectfully submitted that the instant methods are all quite well known and would have been obvious alternative and equivalent methods of mold making.

Applicants respectfully submit that this is not the case, because Teshima et al. is predicated upon a detailed electro-deposition and electroplating process to form the mold, and does not describe or suggest that a mold for forming localized positive optical power units can comprise photo-polymer or plastic material. Moreover, the unique combinations of thermal plastic material or ultraviolet radiation polymerizable

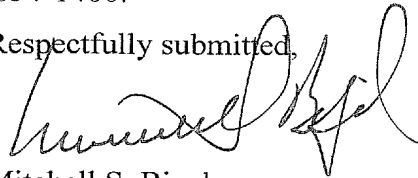
In re: Richard M. Knox et al.  
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photo-polymer material for the mold, as well as for the localized positive optical power units themselves, as recited in the above-analyzed dependent claims, is certainly not described or suggested by Teshima et al.

**Conclusion**

Applicants again thank the Examiner for the thorough examination and the citation of Teshima et al. The independent and dependent claims have been amended significantly in response thereto, to further clarify patentability over Teshima et al. Accordingly, Applicants respectfully request entry of these amendments and allowance of the present application. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,

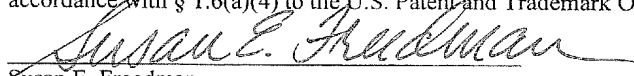


Mitchell S. Bigel  
Registration No. 29,614  
Attorney for Applicants

**Customer Number 20792**  
Myers Bigel Sibley & Sajovec, P.A.  
P.O. Box 37428  
Raleigh, NC 27627  
919-854-1400  
919-854-1401 (Fax)

**CERTIFICATION OF TRANSMISSION**

I hereby certify that this correspondence is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4) to the U.S. Patent and Trademark Office on March 1, 2007.



Susan E. Freedman  
Date of Signature: March 1, 2007